Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

How quickly can you catch covid-19 again?

A prior infection appears to offer some protection, but it is unclear for how long, or whether reinfections are guaranteed to be mild, finds **Clare Wilson**

AS THE omicron variant of the coronavirus continues to spread, many people who have already contracted the virus once are picking it up again. But a key question remains unresolved: for how long after a covid-19 infection are people likely to be protected from reinfection?

A lot hinges on the answer, as new omicron subvariants called BA.4 and BA.5 are on the rise in South Africa. It is still unclear if this will translate into a large wave in that country or elsewhere.

With some infections, such as measles, if someone has had the disease once, they rarely catch it a second time. Coronaviruses don't seem to provoke such "sterilising immunity", although a first infection does reduce people's risk of a second one.

In unvaccinated people, for instance, a first infection cuts people's risk of a second one by about 85 per cent, according to a large US study. This is similar to the level of protection provided by two doses of the mRNA covid-19 vaccines and was stable over the nine months of the study. "I was surprised that we found such a high level of protection," says Jessica Ridgway at the University of Chicago.

Ridgway's study was done while the delta variant was the dominant virus strain circulating globally, though. Omicron causes more reinfections than past variants, because of mutations in its spike protein that help it to evade immunity. During the UK's recent omicron wave, reinfections were 16 times more likely than during the previous delta wave, according to the Office for National Statistics (ONS).

This still doesn't tell us how long most people can expect to be protected before having another covid-19 infection, however.

PATRICK T. FALLON/AFP VIA GETTY IMAGES

Masked and maskless people at an airport in Colorado last month

Indeed, it isn't yet possible to calculate this figure with any accuracy, although we can get a hint from existing data. For instance, the ONS has looked at reinfections in the UK, covering the pandemic from its beginning up to mid-December 2021, when omicron had been dominant for several weeks. The study found that the interval between reinfections ranged from 90 to 650 days, with the average being 343 days, or nearly a year.

But these figures could have two sources of error. First, they could be too low an estimate because many people haven't yet had two infections. When they have, and their data can be added to the calculations, the average interval between infections should rise.

Second, some reinfections will be going unrecognised, as the ONS classes someone as being reinfected only if more than 90 days has passed since a previous infection confirmed by a PCR test. That is because these tests can lead to false-positive results within this period. This approach "identifies the majority of reinfections while excluding those people who may still have virus detected for some time after their initial infection", says Helen Campbell at the UK Health Security Agency.

But reinfections within 90 days can happen, as shown by a study in Denmark, a country that experienced a surge of omicron cases beginning in November 2021, caused by peaks of omicron subvariants BA.1 and BA.2 merging into each other. Morten Rasmussen at the Statens Serum Institute in Copenhagen, Denmark, and his colleagues managed to find 47 people who were infected with both subvariants, with intervals of between 20 and 60 days. "It does seem to be rare," says Rasmussen.

20
One of the shortest recorded gaps between reinfections, in days

343
The average reinfection interval according to UK figures, in days

650
The longest reinfection interval according to UK figures, in days

A reason why there is so much interest in the reinfection question is concern that repeated covid-19 infections might have a cumulative toll on people's health. Studies suggest that subsequent bouts of coronavirus are less severe than the first one. Research in Qatar, for instance, found that second infections were linked to a 90 per cent lower chance of hospitalisation or death than initial ones.

But that is no guarantee of safety, says Stephen Griffin at the University of Leeds, UK, who is a member of Independent SAGE, a group that offers independent scientific advice on covid-19 to the UK government. It is still unclear how likely people are to develop long-lasting symptoms from an infection, but if someone catches covid-19 several times then, overall, their chance of long covid may rise, says Griffin. "The less likely things are more likely to happen with a greater number of times you get reinfected," he says.

Rasmussen believes it is too soon to know the effect of repeat infections on people's risk of long covid or anything else. "It feels like [the pandemic] has been going on for hundreds of years, but it's really been an incredibly short amount of time," he says. "It does not look as if it's going to go away." ▮